

practical horizontal distance, but in no case less than 2 meters, from the lights or shapes prescribed in Rule 27(b)(1) and (2). In no case shall the upper of these lights or shapes be at a greater height than the lower of the three lights or shapes prescribed in Rule 27(b)(1) and (2).

[CGD 81-008, 46 FR 62447, Dec. 24, 1981, as amended by USCG-2012-0306, 77 FR 37313, June 21, 2012]

§ 84.09 Screens.

(a) The sidelights of vessels of 20 meters or more in length shall be fitted with mat black inboard screens and meet the requirements of § 84.17. On vessels of less than 20 meters in length, the sidelights, if necessary to meet the requirements of § 84.17, shall be fitted with mat black inboard screens. With a combined lantern, using a single vertical filament and a very narrow division between the green and red sections, external screens need not be fitted.

(b) On power-driven vessels less than 12 meters in length constructed after July 31, 1983, the masthead light, or the all-round light described in Rule 23(c) shall be screened to prevent direct illumination of the vessel forward of the operator's position.

§ 84.11 Shapes.

(a) Shapes shall be black and of the following sizes:

(1) A ball shall have a diameter of not less than 0.6 meter;

(2) A cone shall have a base diameter of not less than 0.6 meter and a height equal to its diameter;

(3) A diamond shape shall consist of two cones (as defined in paragraph (a)(2) of this section) having a common base.

(b) The vertical distance between shapes shall be at least 1.5 meter.

(c) In a vessel of less than 20 meters in length shapes of lesser dimensions but commensurate with the size of the vessel may be used and the distance apart may be correspondingly reduced.

§ 84.13 Color specification of lights.

(a) The chromaticity of all navigation lights shall conform to the following standards, which lie within the boundaries of the area of the diagram

specified for each color by the International Commission on Illumination (CIE), in the "Colors of Light Signals", which is incorporated by reference. It is Publication CIE No. 2.2. (TC-1.6), 1975, and is available from the Illumination Engineering Society, 345 East 47th Street, New York, NY 10017 and is available for inspection at the Coast Guard, Ocean Engineering Division (CG-432), (CG-432), 2100 2nd St., SW., Stop 7901, Washington, DC 20593-7901. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. This incorporation by reference was approved by the Director of the Federal Register.

(b) The boundaries of the area for each color are given by indicating the corner co-ordinates, which are as follows:

(1) White:

x	0.525	0.525	0.452	0.310	0.310	0.443
y	0.382	0.440	0.440	0.348	0.283	0.382

(2) Green:

x	0.028	0.009	0.300	0.203
y	0.385	0.723	0.511	0.356

(3) Red:

x	0.680	0.660	0.735	0.721
y	0.320	0.320	0.265	0.259

(4) Yellow:

x	0.612	0.618	0.575	0.575
y	0.382	0.382	0.425	0.406

[CGD81-008, 46 FR 62447, Dec. 24, 1981, as amended at 69 FR 18803, Apr. 9, 2004; USCG-2004-18057, 69 FR 34925, June 23, 2004; USCG-2008-0179, 73 FR 35002, June 19, 2008; USCG-2010-0351, 75 FR 36281, June 25, 2010]

§ 84.15 Intensity of lights.

(a) The minimum luminous intensity of lights will be calculated by using the formula:

$$I=3.43 \times 10^6 \times T \times D^2 \times K^{-D}$$

Where

I: Luminous intensity in candelas under service conditions,

T: Threshold factor 2×10^{-7} lux,

D: Range of visibility (luminous range) of the light in nautical miles,

K: Atmospheric transmissivity. For prescribed lights the value of K will be 0.8,

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corresponding to a meteorological visibility of approximately 13 nautical miles.

(b) A selection of figures derived from the formula is given in Table 84.15(b):

TABLE 84.15(b)

Range of visibility (luminous range) of light in nautical miles D	Minimum luminous intensity of light in candelas for $K=0.8$
1	0.9
2	4.3
3	12
4	27
5	52
6	94

[CGD 81-008, 46 FR 62447, Dec. 24, 1981, as amended by USCG-2012-0306, 77 FR 37313, June 21, 2012; USCG-2012-0306, 77 FR 42637, July 20, 2012]

§ 84.17 Horizontal sectors.

(a)(1) In the forward direction, sidelights as fitted on the vessel shall show the minimum required intensities. The intensities shall decrease to reach practical cut-off between 1 and 3 degrees outside the prescribed sectors.

(2) For sternlights and masthead lights and at 22.5 degrees abaft the beam for sidelights, the minimum required intensities shall be maintained over the arc of the horizon up to 5 degrees within the limits of the sectors prescribed in Rule 21. From 5 degrees within the prescribed sectors the intensity may decrease by 50 percent up to the prescribed limits; it shall decrease steadily to reach practical cut-off at not more than 5 degrees outside the prescribed sectors.

(b) All-round lights shall be so located as not to be obscured by masts, topmasts or structures within angular sectors of more than 6 degrees, except anchor lights prescribed in Rule 30, which need not be placed at an impracticable height above the hull, and the all-round white light described in Rule 23(d), which may not be obscured at all.

(c) If it is impracticable to comply with paragraph (b) of this section by exhibiting only one all-round light, two all-round lights shall be used suitably positioned or screened to appear, as far as practicable, as one light at a minimum distance of one nautical mile.

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NOTE TO PARAGRAPH (c): Two unscreened all-round lights that are 1.28 meters apart or less will appear as one light to the naked eye at a distance of one nautical mile.

[CGD 81-008, 46 FR 62447, Dec. 24, 1981, as amended by CGD 94-011, 63 FR 5731, Feb. 4, 1998; USCG-2012-0306, 77 FR 37313, June 21, 2012]

§ 84.19 Vertical sectors.

(a) The vertical sectors of electric lights as fitted, with the exception of lights on sailing vessels underway and on unmanned barges, shall ensure that:

(1) At least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;

(2) At least 60 percent of the required minimum intensity is maintained from 7.5 degrees above to 7.5 degrees below the horizontal.

(b) In the case of sailing vessels underway the vertical sectors of electric lights as fitted shall ensure that:

(1) At least the required minimum intensity is maintained at all angles from 5 degrees above to 5 degrees below the horizontal;

(2) At least 50 percent of the required minimum intensity is maintained from 25 degrees above to 25 degrees below the horizontal.

(c) In the case of unmanned barges the minimum required intensity of electric lights as fitted shall be maintained on the horizontal.

(d) In the case of lights other than electric lights these specifications shall be met as closely as possible

[CGD 81-008, 46 FR 62447, Dec. 24, 1981, as amended by CGD 89-024, 55 FR 3947, Feb. 6, 1990]

§ 84.21 Intensity of non-electric lights.

Non-electric lights shall so far as practicable comply with the minimum intensities, as specified in the Table given in § 84.15.

§ 84.23 Maneuvering light.

Notwithstanding the provisions of § 84.03(f), the maneuvering light described in Rule 34(b) shall be placed approximately in the same fore and aft vertical plane as the masthead light or lights and, where practicable, at a minimum height of one-half meter vertically above the forward masthead